

REMARKS/ARGUMENTS

Claims 1 to 20 and 22 are currently pending in this application. Claim 1 has been amended with this response, and claim 22 has been canceled. No new matter has been added with this response.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected all of the pending claims as unpatentable under 35 U.S.C. §103(a) over either Odagawa et al. (USPN 5,647,921) in view of the teachings of Liebermann (USPN 4,791,979). Applicants respectfully traverse this rejection.

As Applicants discussed in their previous response, the current invention is directed to an improved process for producing thick continuous sheet sections of amorphous metal. To accomplish this Applicants have modified conventional continuous sheet casting processes to include a stabilization step that carefully controls the temperature of the molten alloy between the melting temperature (T_m) and the crystallization cooling curve nose temperature (T_{nose}) so that the exact viscosity of the liquid alloy can be controlled prior to introduction of the alloy onto the sheet casting roller.

This runs counter to the prior art systems, such as those described by Odagawa et al., Liebermann and Pryor et al., which in Applicants' opinion do not "stabilize" the casting temperature in such a way as to ensure an acceptable viscosity, but rather focus entirely on how the mechanics of the casting process, such as roller speed, slit size, slit geometry, cooling rate, etc., may be modified to contend with the low viscosity materials being used. However, the Examiner dismisses Applicants' previous arguments by stating the critical step of "stabilizing" in Applicants' claims contains no information concerning the "casting temperature" used and so being a "relative" term may cover the processes set forth in the prior art. (Office action, page 3.)

To address this short-coming, Applicants have amended the pending claims to specify that the bulk metallic glass material must be "stabilized" within a temperature range defined by the "melting" and "nose" temperatures of the bulk metallic glass. The specification makes clear that it is in this tight "window" of temperatures that the materials will have the requisite viscosity properties. (See, Specification, page 8, line 30 to page 9, line 10.)

The Examiner has acknowledged that nowhere, do any of the prior art patents ever discuss a stabilization step. Now that stabilization step, as set forth in the claims, provides specific and objective criteria that must be met to practice the method of the current invention, Applicants submit that the term "stabilization" can no longer be considered "relative". Moreover, the claims of the current invention further require that only such "stabilized" amorphous material be "introduced" into the casting apparatus. As such, it is not true that merely introducing molten amorphous material to a moving casting roller, as described by all of the prior art references, can be seen as equivalent to the process described by the instant invention, as it is nowhere suggested that the temperature of that material should be manipulated at all, much less that it should be "stabilized" within a specific temperature window as set forth by the current invention.

In conclusion, all of the prior art patents cited by the Examiner are focused on adjusting the roller speed and nozzle alignment/design to ensure appropriate casting of thin sheets of molten metals with low viscosities. These are precisely the type of conventional casting techniques that the current invention was designed to modify to allow for the casting of thicker amorphous sheets. Accordingly, Applicants submit that one of skill in the art, having read the combined teachings of the Odagawa et al. and Liebermann and/or Pryor et al. references, would not have had any motivation to include a viscosity stabilization step, in which the temperature of the bulk metallic glass is stabilized within a temperature window defined by the melting temperature and

"nose" temperature of the alloy, as required by the claims of the current application, but rather would have been motivated to attempt changes to the roller speed, nozzle width, nozzle gap, etc. to adjust for the low viscosity of the material. As such, Applicants believe the combination of the cited references would have reinforced the need to resort to such "mechanisitic" manipulations, leading one of ordinary skill further away from Applicants own casting technique.

In summary, given the process parameters repeatedly taught by the cited prior art, one of skill in the art would have had no motivation to modify those same references to produce the method claimed in the current application. Accordingly, Applicants submit that the claimed invention cannot be said to be obvious in light of the combination of Odagawa et al. and Liebermann and/or Pryor et al..

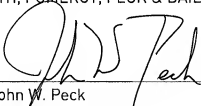
Conclusion

In view of the foregoing amendment and response, it is believed that the application is in condition for further examination. If any questions remain regarding the allowability of the application, Applicant would appreciate if the Examiner would advise the undersigned by telephone.

Respectfully submitted,

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